

Appendix 6

BURNS AND MCBRIDE PROPERTY WILMINGTON, DELAWARE

SIRB ID: DE-0325



GENERAL SITE INFORMATION

Site Name: Burns and McBride Property (105 S. Market Street Property)

SIRB ID Number: DE-0325

<u>Site Location and Description:</u> The 105 S. Market Street Property is located immediately south of the Christina River at Market Street in Wilmington, Delaware (Figure 1). The property is bordered by the Christina River to the north, Market Street to the east, City of Wilmington 20-foot-wide easement and the Salvation Army to the south, and land owned by the City of Wilmington to the west. The City of Wilmington parcel to the west contains subsurface utilities and the southern terminus of a submarine utility tunnel that runs beneath the Christina River. The surrounding land is generally commercial and residential.

The 105 S. Market Street Property (tax parcel #26-043.00-010) is approximately 1.29 acres and was previously owned by 105 S. Market Street Associates, LLC and used by the Burns & McBride heating oil company. According to a title search performed in 1990 by WIK Associates, Burns and McBride purchased the property in 1977, and according to an interview with the previous owner, ceased operations at the site as a bulk storage facility in 2000. The current owners of the property decommissioned the site in order to utilize it as a temporary parking lot. Site decommissioning included cleaning and dismantlement of the ASTs, asbestos abatement of the storage building, demolition of all site buildings, removal of demolition debris and placement of crushed concrete around the building slabs in order to transition the grade of the protruding building slab from the original ground surface. In March 2006, DNREC granted approval to the owners to utilize the site as a temporary parking lot for up to 24 months starting from the December 20, 2005 signing of the Brownfield Development Agreement (BDA). A letter was submitted on behalf of the owners to DNREC in November 2007 requesting an extension of the temporary site usage until December 2008. The site is no longer being utilized as a parking lot, but quarterly inspections are being conducted at the site in accordance with the DNREC approved February 2006 Operations and Maintenance Plan for Temporary Site Uses Prior to Remediation and Redevelopment. Currently the site is vacant with a perimeter fence preventing access to the lot.



<u>Previous Site Uses:</u> The site is located in an area of Wilmington that has been in continuous industrial use since the late 1700s. The historical use of the site was investigated through a review of the following sources: aerial photographs, fire insurance maps, historic atlases, interviews with past and/or present owners and operators, and building records.

Based on the sources reviewed, the first developed use of the property appeared to have occurred between 1868 and 1893. It appears that the subject property was historically maintained as vacant marshy land, a gasoline station, and an oil storage facility. The nearby properties to the south appeared to have been maintained as several industrial operations including a carriage works facility, at least three different leather/hairworks operations, and the Salvation Army. The adjacent property to the east appeared to have been maintained as a lumber, coal, lime, and sand yard, the International Harvester Company, and an auto repair facility. The Salvation Army and a vegetated property currently used by the City of Wilmington Water Department currently surround the site.

<u>Site Regulatory Status:</u> This section briefly summarizes previous investigations performed on the site through the SIRB program. A current SIRB regulatory status is also included.

Brownfield Remedial Investigation (BrightFields, 2007)

Fourteen soil borings were advanced, 11 test pits were excavated, and 37 soil samples were analyzed at the DNREC-SIRB's Laboratory for volatile organic compounds (VOCs), metals, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) for this Brownfield Remedial Investigation. Thirteen of the 37 soil samples were analyzed at STL Edison for some or all of the following parameters: target analyte list (TAL) metals and cyanide, TCL VOCs, TCL semi-volatile organic compounds (SVOCs), and TCL pesticides and PCBs using HSCA methods. An additional 26 soil samples were analyzed for total arsenic and total lead. Boring and test pit logs from site investigations indicate that the site is filled with industrial fill (5 to 15 feet thick) on top of low permeability marsh deposits.

Petroleum odors were observed at every boring and test pit location, except for GP14, where a strong naphthalene (mothball-like) odor was observed. Photo-ionization detector (PID) readings during drilling and test pit excavations were as high as 1,300 parts per million (ppm).

In the southwest corner of the property, a layer of white to light gray fill with elevated arsenic concentrations is present. This material is likely the waste products from the leather processing



and hair works facilities that were formerly located on the nearby properties to the south.

Surface Soil Contaminants of Concern

- 1. Arsenic is a site contaminant of concern for surface soil restricted use.
- 2. Arsenic and benzo(a)pyrene, are site contaminants of concern for surface soil unrestricted use.
- 3. Copper is a contaminant of concern in the surface soil under an <u>unrestricted use</u>, at one boring location, GP13.
- 4. Lead is a contaminant of concern in the surface soil under an <u>unrestricted use</u>, at one location, GP12.

Subsurface Soil Contaminants of Concern

- 5. Arsenic, lead, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene are site contaminants of concern for subsurface soil restricted use.
- 6. Arsenic, lead, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene are site contaminants of concern for subsurface soil <u>unrestricted use</u> of the property.
- 7. Naphthalene is a contaminant of concern in the subsurface soil under both <u>restricted</u> and unrestricted use, at one boring location, GP14.
- 8. Vinyl chloride is a contaminant of concern in the subsurface soil under an unrestricted use, at one location, test pit TP03.
- 9. Toxicity characteristic leaching procedure (TCLP) arsenic and lead analytical results indicate that subsurface soil at two different boring locations (GP14 and GP10) would be classified as RCRA hazardous waste if it was excavated.

Groundwater Investigation Findings:

- 10. Four new monitoring wells were installed during the BRI and one groundwater sample was collected from each of the new wells. The samples were analyzed at STL Edison for TCL VOCs, TCL SVOCs, TCL pesticides/PCBs, and TAL metals and cyanide using HSCA protocols.
- 11. Arsenic and chloroethane are contaminants of concern in groundwater beneath the site.
- 12. Benzene and carbazole are contaminants of concern in groundwater in the vicinity of well GW1.
- 13. To obtain more information on groundwater flow in the area, BrightFields and DNREC-SIRB collaborated to collect a simultaneous round of groundwater level



measurements from the 105 S. Market Street property and the adjacent Salvation Army property. These data, collected on June 6, 2006 showed that groundwater from the western half of the combined two properties appears to flow toward the bend in the Christina River to the west and north, and groundwater from the eastern half of the site, adjacent to South Market Street, appears to flow away from the River to the east and southeast (Figure 5).

Sediment Investigation Findings:

- 14. Sediment samples were collected at three locations along the bank of the Christina River adjacent to the site (one near an exposed pipe on the face of the bulkhead, another near one of the large cracks in the bulkhead and one at the upstream corner of the property).
- 15. The following compounds exceeded DNREC's sediment URS criteria: various metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, and zinc), toluene, PAHs (fluoranthene, benzo(a)anthracene, benzo(a)pyrene, and chrysene), and 4,4-DDT.

Current Regulatory Status:

The Remedial Investigation has been approved by DNREC and the Final Plan of Remedial Action was issued in September 2008. There are no immediate plans to begin site remediation. Currently the site is stabilized with crushed concrete and old concrete foundations. In an effort to prevent any off-site soil migration, Jersey barriers and sand bags border the site along the river, but have been disturbed since the site has been vacated. The site is currently vacant with a perimeter fence preventing access; quarterly inspections are still being conducted at the site in accordance with the DNREC-approved February 2006 Operations and Maintenance Plan for Temporary Site Uses Prior to Remediation and Redevelopment.



SUMMARY OF SITE PCB INFORMATION

Site Investigation PCB Findings:

PCBs (Aroclor-1248) were detected in surface soil at one location, GP13-S001 (0.6 to 3.1 feet below ground surface (bgs)) at a concentration of 0.140 mg/kg, which is below both the unrestricted use and restricted use Uniform Risk-Based Remediation Standard (URS) values for human health for total PCBs.

Due to the fact that there was only one detection in the surface soil, this detected value was used in the calculations instead of calculating the 95% upper confidence level (UCL) of the mean across the site. There were no PCBs detected in groundwater or in the subsurface saturated zone.

Concentrations of PCBs on Site						
Sample Matrix	Corresponding Figure	Analytical Methods	Range of Total PCBs			
Surface Soil	Figure 2	Method 8082	Not detected to 0.14			
·			mg/kg			
Subsurface Soil (unsaturated)	Figure 3	Method 8082	Not detected			
Subsurface Soil (saturated)	Figure 4	Method 8082	Not detected			
Groundwater	Figure 5	Method 8082	Not detected			

A summary of all samples collected for PCB analysis are presented in the attached Tables 1 through 5.

Acreage where PCBs detected:

Estimated surface soil area impacted by PCBs is 0.06 acres in the vicinity of GP13 (Figure 2). The total area of subsurface unsaturated soils impacted by PCBs is 0.19 acres in the vicinity of GP13. There were no reported concentrations of PCBs in the subsurface soils in contact with groundwater.

PCB Remediation Status:

PCB concentrations did not exceed the unrestricted use URS; therefore, no PCB remediation is required at the Burns and McBride site.



PCB MASS LOADING SUMMARY

The PCB mass loading rate to surface water via overland flow is discussed below. There were no reported concentrations of PCBs in the subsurface saturated zone or in the groundwater; therefore, groundwater transport is not considered a mechanism of transport for PCBs at this site. A summary of the results is included below and the details of the calculations are included as attachments to this Appendix.

OVERLAND FLOW:

Overland flow has been calculated on this site using the Revised Universal Soil Loss Equation (RUSLE). The RUSLE predicts the long term average annual rate of erosion on an area based on rainfall patterns, soil type, topography, cover/canopy factors and support management practices. These factors are site-specific and require information pertaining directly to the site. A breakdown of the individual factors is presented below with a brief explanation of their selection.

Ground Cover and Canopy:

A site inspection was performed on June 23, 2008 to estimate the current site ground cover and canopy. The cover/management factor (C) assigned to the site and associated flow path is 0.0575, which corresponds to crushed stone mulch 4.5 inches thick. Photographs of the site ground cover and canopy are attached.

Site Sediment and Erosion Control Practices:

Currently the site has large Jersey barriers and sand bags to help prevent the off-site migration of soil. Crushed stone has been placed across the property (~ 3 to 12 inches thick) to allow for a temporary parking lot. Photographs of these sediment and erosion control techniques in use at the site are attached.

Input Factors and Results:

A breakdown of the individual factors used in the assessment is presented below with a brief explanation of their choice.

RUSLE Factors	Values Provided	Explanation of Selection
R = rainfall-runoff erosivity index (10 ² ft-tonf-in/ac-hr)	170	An appropriate value for R for the site was determined from plots of Rainfall patterns for the Eastern U.S. (Wischmeier and Smith, 1978).



RUSLE Factors	Values Provided	Explanation of Selection
K = soil erodibility (0.01 tonf acre hr/acre ft-ton in)	0.365	The soil erodibility factor was chosen based on the information provided by the boring log represented for GP13 in BrightFields 2007 Investigation Report.
LS = topographic factor (dimensionless)	0.109	The slope length was estimated to 135 feet, which is the distance between the sample detection centroid and the Christina River along the overland flow path. Spot elevations and length were used to calculate a topographic factor of 0.109.
C = cover/management factor (dimensionless)	0.0575	The cover/management factor C assigned to the site and associated flow path was 0.0575, which corresponds to stone mulch 4.5" thick.
P = support practice factor (dimensionless)	1.0	Jersey barriers and sand bags border the river, but do not impede the flow of surface runoff in the vicinity of GP13.

The average annual erosion rate is based on the windows based RUSLE2 program (RUSLE2 License, version 2006-Jul-24).

Based on the calculations performed, the total PCB loading from the Burns and McBride site to the Christina River via erosion under current site conditions is 0.003 grams per year.

Groundwater Transport:

Because the detected PCBs were located only in surface soil, groundwater is not a likely mechanism of transport of PCB contamination at the Burns and McBride site and no groundwater transport calculations were performed.



Uncertainty Analysis Associated with Overland Flow:

Specific Areas and Degree of Uncertainty for the Burns and McBride Property

	Samples Per Acre (site)	Chemical Data Quality*	Topography	Soil Type	Site Coverage	Map Quality	Distance to Discharge Points
Site Specific Information	28.2	Immunoassay	Based on site inspection findings	Detailed logs that are located within the area of concern	Based on a thorough site assessment.	Scaled Map	135 feet
Degree of Uncertainty	Low	High	High	Low	Low	Moderate	Low to Moderate

^{*} Primary analysis used in the historical samples

Sources of uncertainty concerning the Burns and McBride Property include the following: topography was based on spot elevations collected prior to the demolition of the buildings. This provided inadequate spatial distribution of topography for the site. Based on this evaluation the overall level of uncertainty associated with PCB mass loading from the Burns and McBride site is **moderate**.



Site References:

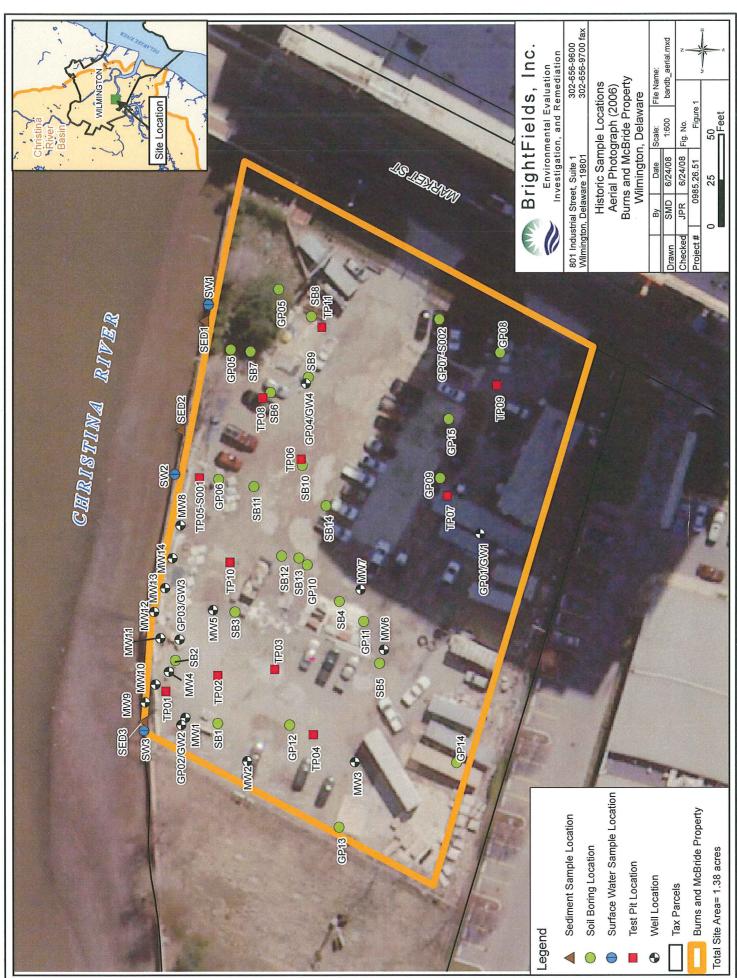
BrightFields, 2007, <u>Remedial Investigation Report, 105 S. Market Street Property (DE-0325)</u>, <u>Wilmington, Delaware (DE-1293)</u>, December 2007.

BrightFields, 2006, <u>Operations and Maintenance Plan for Temporary Site Uses Prior to Remediation and Redevelopment</u>, February 2006.

Delaware Department of Natural Resources and Environmental Control (DNREC) – Site Investigation and Restoration Branch (SIRB), 2008, <u>Final Plan of Remedial Action</u>, <u>Burns and McBride Property</u>, September 2008.

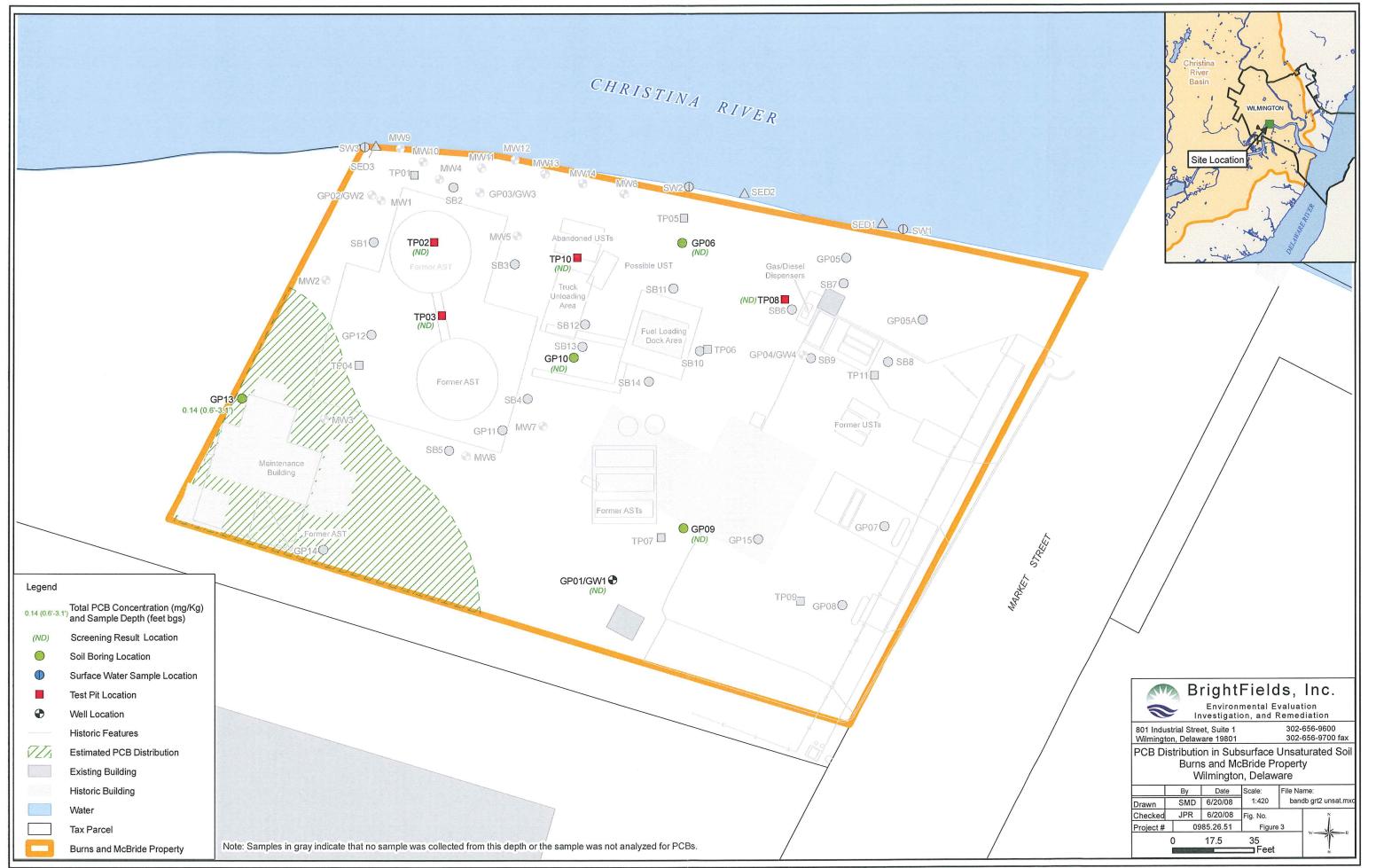


Figures

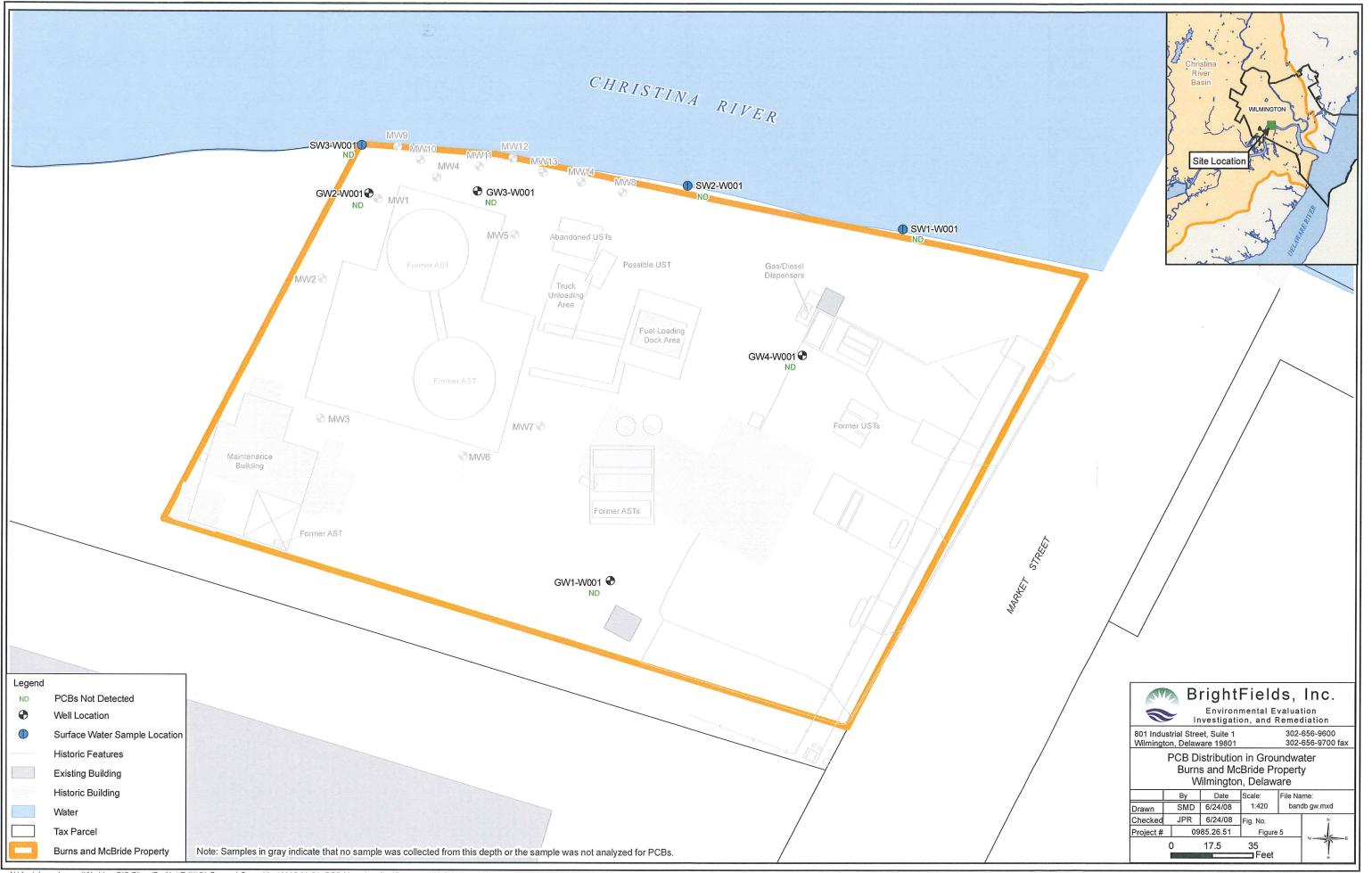


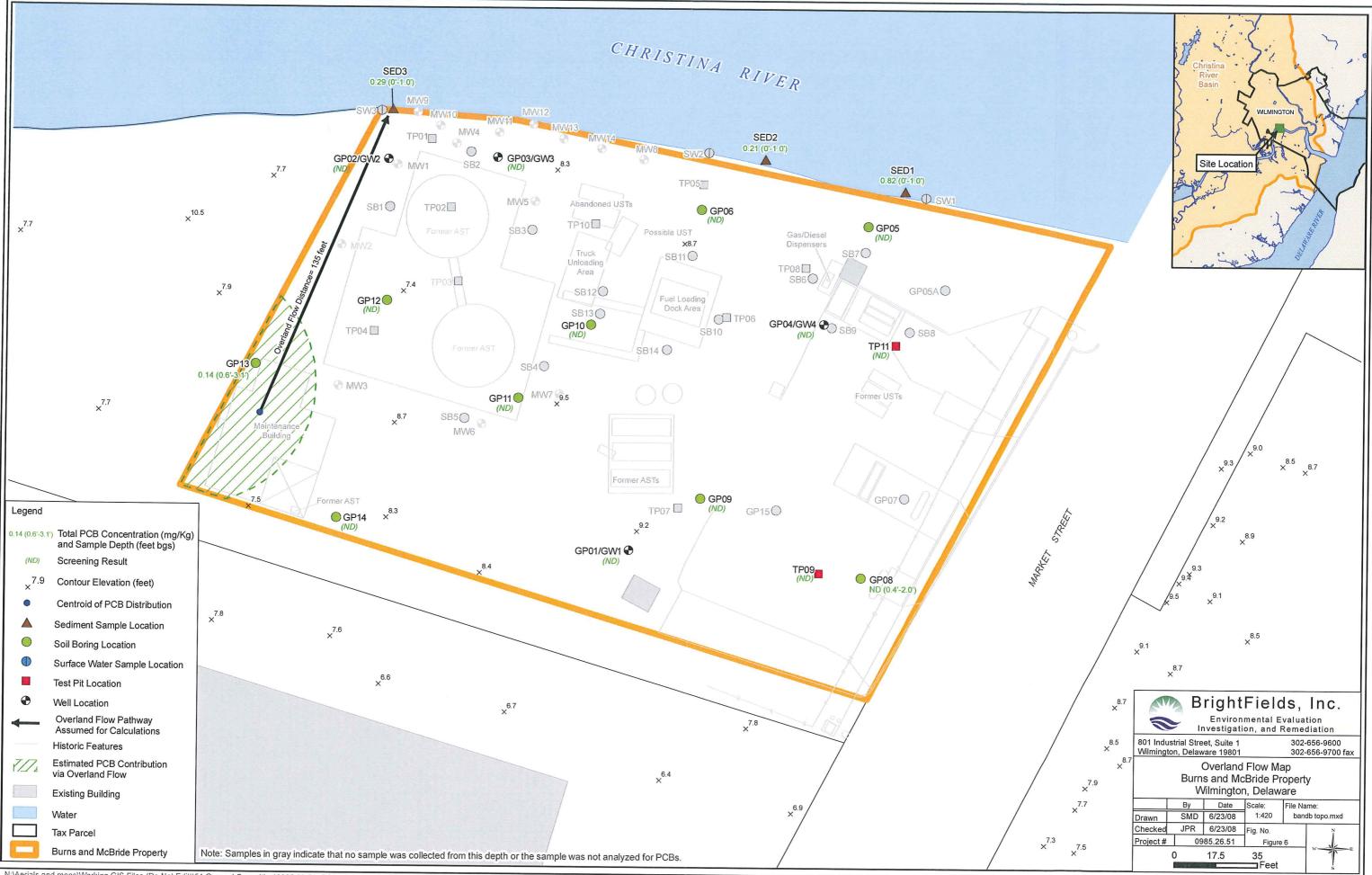
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Tables

PCB Analytical Results For Soil Burns and McBride Property Wilmington, DE SIRB ID: DE-0325 Table 1

Sample ID Sampling Depth (feet bgs) Sampling Date Units	DNREC URS for Protection of Huma Health Non-critical Water Resource Area mg/Kg	rotection of Human alth er Resource Area y/Kg	GP08-S001 0.4-2.0 9/14/05 mg/Kg	GP12-S002 4.6-6.8 9/14/05 mg/Kg	GP13-S001 0.6-3.1 9/14/05 mg/Kg	TP07-S001 7.0-7.5 9/15/05 mg/Kg
Report Issued	Unrestricted Use	Restricted Use	BRI (BrightFields 2007)	BRI (BrightFields 2007)	BRI (BrightFields 2007) BRI (BrightFields 2007) BRI (BrightFields 2007) BRI (BrightFields 2007)	BRI (BrightFields 200
PCBs						
Aroclor-1016	5	82	U 0.075 U	U 880.0	0.084 U	0.08
Aroclor-1221	0.3	3	U 0.075 U	U 880.0	0.084 U	1.08 U
Aroclor-1232	0.3	က	U.075 U	U 880.0	0.084 U	2.08 U
Aroclor-1242	0.3	3	U 0.075 U	U 880.0	0.084 U	3.08 U
Aroclor-1248	0.3	3	U 570.0	U 880.0	0.14	4.08 U
Aroclor-1254	0.3	3	U 5/00	U 880.0	0.084 U	5.08 U
Aroclor-1260	0.3	3	0.075 U	0.088 U	0.084 U	0.08 U
Aroclor-1262	nca	nca	0.075 U	0.088 U	0.084 U	7.08 U

BRI (BrightFields 2007) - Brownfield Remedial Investigation Report for 105 S. Market Street

Qualifiers
U - The compound was not detected above the indicated laboratory detection limit
NR - Not analyzed
nca - no criteria available
bold - concentration is above DNREC URS unrestricted use criteria
shaded - concentration is above DNREC URS restricted use criteria

Table 2
PCB Analytical Results For Groundwater
Burns and McBride Property
Wilmington, DE
SIRB ID: DE-0325

Sample ID Sampling Date Units Report Issued	DNREC URS for Protection of Human Health ug/L	GW01-W001 9/21/05 ug/L BRI (BrightFields 2007)	GW02-W001 9/21/05 ug/L BRI (BrightFields 2007)	GW03-W003 9/21/05 ug/L BRI (BrightFields 2007)	GW04-W004 9/21/05 ug/L BRI (BrightFields 2007)
PCBs					
Aroclor-1016	0.1	0.56 U	U 85.0	0.51 U	0.56 U
Aroclor-1221	0.03	0.56 U	0.58 U	0.51 U	0.56 U
Aroclor-1232	0.03	0.56 U	0.58 U	0.51 U	0.56 U
Aroclor-1242	0.03	0.56 U	U 85.0	0.51 U	0.56 U
Aroclor-1248	0.03	0.56 U	0.58 U	0,51 U	U 95.0
Aroclor-1254	0.03	0.56 U	U 85.0	0.51 U	0.56 U
Aroclor-1260	0.03	0.56 U	0.58 U	U 15:0	0.56 U
Aroclor-1262	nca	0.56 U	0.58 U	U 151	0.56 U

BRI (BrightFields 2007) - Brownfield Remedial Investigation Report for 105 S. Market Street

Qualifiers

U - The compound was not detected above the indicated laboratory detection limit
NR - Not analyzed
nca - no criteria available
bold - concentration is above DNREC URS unrestricted use criteria
shaded - concentration is above DNREC URS restricted use criteria

Table 3 DNREC PCB Screening Data Burns and McBride Property Wilmington, DE

SIRB ID: DE-0325

Sample ID	Sample Depth	Investigation Report	Sample Date	DNREC URS for Protection of Human Health (Non-critical Water Resource Area) Unrestricted Use (mg/kg)	Total PCBs (mg/kg)
GP01-S001	0.3-2.0	BRI (BrightFields 2007)	9/13/05	1	ND
GP01-S002	3-5	BRI (BrightFields 2007)	9/13/05	1	ND
GP02-S001	0-2	BRI (BrightFields 2007)	9/13/05	1	ND
GP02-S002	4-5.8	BRI (BrightFields 2007)	9/13/05	1	ND
GP03-S001	0.3-2	BRI (BrightFields 2007)	9/13/05	1	ND
GP03-S002	5.1-5.9	BRI (BrightFields 2007)	9/13/05	1	ND
GP04-S001	0.3-2	BRI (BrightFields 2007)	9/13/05	1	ND
GP04-S002	6-9	BRI (BrightFields 2007)	9/13/05	1	ND
GP05-S001	0-2	BRI (BrightFields 2007)	9/13/05	1	ND
GP05-S002	8-9	BRI (BrightFields 2007)	9/13/05	1	ND
GP06-S001	0-2	BRI (BrightFields 2007)	9/13/05	1	ND
GP06-S002	4.6-6	BRI (BrightFields 2007)	9/13/05	1	ND
GP07-S002	6-7	BRI (BrightFields 2007)	9/13/05	1	ND
GP08-S001	0.4-2	BRI (BrightFields 2007)	9/14/05	1	ND
GP08-S002	5-6.4	BRI (BrightFields 2007)	9/14/05	1	ND
GP09-S001	0.1-2.0	BRI (BrightFields 2007)	9/14/05	1	ND
GP09-S002	5.0-6.8	BRI (BrightFields 2007)	9/14/05	1	ND
GP10-S001	0-2	BRI (BrightFields 2007)	9/13/05	1	ND
GP10-S002	4-6	BRI (BrightFields 2007)	9/13/05	1	ND
GP11-S001	0-2	BRI (BrightFields 2007)	9/13/05	1	ND
GP11-S002	4-5.2	BRI (BrightFields 2007)	9/13/05	1	ND
GP12-S001	0.4-2	BRI (BrightFields 2007)	9/14/05	1	ND
GP12-S002	4.6-6.8	BRI (BrightFields 2007)	9/14/05	1	ND
GP13-S001	0.6-3.1	BRI (BrightFields 2007)	9/14/05	1	ND
GP13-S002	4.3-6.3	BRI (BrightFields 2007)	9/14/05	1	ND
GP14-S001	0.4-2.0	BRI (BrightFields 2007)	9/14/05	1	ND
GP14-S002	8.0-9.6	BRI (BrightFields 2007)	9/14/05	1	ND
TP01-S001	6.5-7.0	BRI (BrightFields 2007)	9/15/05	1	ND
TP02-S001	6.5-7.0	BRI (BrightFields 2007)	9/15/05	1	ND
TP03-S001	3-4	BRI (BrightFields 2007)	9/15/05	1	ND
TP03-S002	7.5-8.0	BRI (BrightFields 2007)	9/15/05	1	ND
TP04-S001	6.5-7.0	BRI (BrightFields 2007)	9/15/05	1	ND
TP05-S001	7.0-7.5	BRI (BrightFields 2007)	9/15/05	1	ND
TP06-S001	5.5-6.0	BRI (BrightFields 2007)	9/15/05	1	ND
TP07-S001	7.0-7.5	BRI (BrightFields 2007)	9/15/05	1	ND
TP08-S001	6.5-7.0	BRI (BrightFields 2007)	9/15/05	1	ND
TP10-S001	5.0-6.0	BRI (BrightFields 2007)	9/15/05	1	ND

Qualifiers:

ND - compound was not detected Bold - concentration exceeds URS

nca - no criteria available



Site Photographs



PCB Mass Loading Evaluation Burns and McBride Site



Approximate location of GP13; surface PCB concentrations detected at this location.



Overland flow pathway for GP13.

PCB Mass Loading Evaluation Burns and McBride Site Wilmington, Delaware SIRB ID: 0325



PCB Mass Loading Evaluation Burns and McBride Site



Stone mulch on-site, approximately 3 to 12 inches thick.



Overland Flow Calculations

PCB Loading Calculations from the Universal Soil Loss Equation Burns & McBride Wilmington, DE DE-0325

Surface PCB Concentration

0.14 mg/kg

Symbol	Factor	Value	Units
R	Rainfall/Runoff Erosivity Index	170	10 ² ft-tonf in/acre hr
К	Soil Erodibility	0.365	0.01 tonf acre hr/ac ft-ton in
	Estimated Slope Length	135	Feet
	Estimated Elevation Difference	0.96	Feet
	Slope	0.71	Percent
	Erodeable Area	0.06	Acres
LS	Topographic Factor	0.109	Dimensionless
С	Cover and Management Factor	0.0575	Dimensionless
Р	Support Practice Factor	1	Dimensionless
	Average Annual Soil Loss	0.37	ton/ac/yr

PCB Loading via Overland Flow

0.003

grams/year - PCBs

BURNS & MCBRIDE

